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Power & Environmental Data At Your Fingertips

Server Technology ST Eye Monitoring App Lets You View PDU Data From Your Mobile Device

TODAY'S SMART and intelligent power distribution units provide great information about power usage, environmental conditions, and other system-related issues. But getting at that data isn't always as easy as it could be.

"In many cases, the cabinets are locked and the PDUs are located in the hot aisle, where temperatures keep going up, making it harder and harder to work in there," says Calvin Nicholson, senior director of software and firmware development at Server Technology.

The new Server Technology ST Eye mobile monitoring app was designed to eliminate the need to struggle with locked cabinets or work in the hot aisle.

"As people are looking at their PDUs, they look at lots of things—model number, power, environmental reading, the IP address of the device. Those are all really right at the user's fingertips now," Nicholson says.

Leverage New Trends

The primary goal behind ST Eye is to provide data center managers with easy access to the data provided by PDUs. To do that, Nicholson says, Server

Technology engineers really wanted to take advantage of the bring your own device trend.

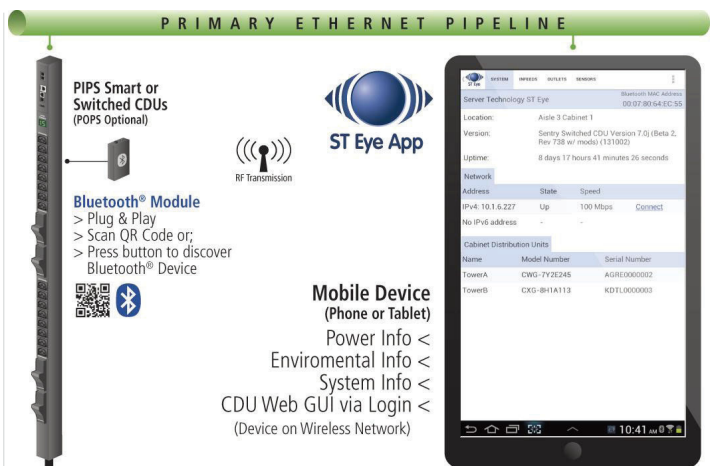
With ST Eye, "we've solved some core problems by leveraging a trend we're seeing in the industry," he says, adding that a lot of enterprise data centers are already using tablets and smartphones for other tasks.

Plug-And-Play

The patented ST Eye application works with a plug-and-play Bluetooth hardware module. Each module comes with two QR codes: one is already placed on the Bluetooth module and the other can be put on the front of the cabinet, for example. An optional 10-foot cable makes it possible to place the Bluetooth module in the front of the cabinet or somewhere else, if needed.

Simply scan the QR Code using your smartphone or tablet, and you can see the data collected by any Server Technology smart or switched PDU with per-inlet power (PIP) or per-outlet power (POP) capabilities.

"You no longer have to go back to the cabinet, push cables out of the way, kneel down,



and push multiple buttons to get the value that you're interested in," Nicholson says, which is often on a small LCD screen on the PDU.

It's all available right from a free Android app on your smartphone or tablet (support for the iOS platform is expected early next year). After all, Nicholson says, "the easiest display to read and see is the one right in your hands."

Boils Down Key Information

Server Technology smart and switched PDUs come with a Web-based graphical user interface that lets users view power, temperature, and other levels via a Web browser.

ST Eye, though, really "boils down the key information—key power, environmental, and system information," Nicholson says. If your mobile device is on wireless, he says, ST Eye includes a link you can click to log right into the PDU from the app itself (with a password).

"It's a very integrated, seamless solution leveraging new technology that's already out there," Nicholson says.



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Lincoln, NE 68501-2545
or
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The screenshot displays the Processor.com website. At the top, there's a navigation bar with links like Register, Contact Us, About Us, and My Personal Library. Below this is the Processor logo and a tagline 'Products, News, & Information Data Centers Can Trust'. A prominent banner offers a 'FREE SUBSCRIPTION' with a 'Sign Up For A' button. The main content area is divided into several sections: 'This Week's Issue' featuring an article on 'Color PDUs', 'Tech & Trends' with links to 'Improve Your Data Center Environment' and 'Plan For & Perform A Server Refresh', and 'Data Center Products For Sale' which includes search filters for part numbers and manufacturers. At the bottom, there are sections for 'Advertising', 'Subscription Headquarters' (with links to subscribe, renew, and address change), and 'Find Vendors'.

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Designed For Redundancy & Failover

A Secondary Site Such As Mainstream Technologies Needs To Match Your Cost, Availability Needs

IT'S NO SECRET that enterprises rely on data centers. Downtime, after all, amounts to lost dollars and lost opportunities.

"Long-term or catastrophic outages without a failover/redundant site could result in business insolvency," says Mark McClelland, VP of IT services at Mainstream Technologies.

In many cases, he says, enterprise leaders are finding that the cost of temporary e-commerce outages—lost revenue, productivity, reputation, and customer support and experience—exceeds the expense of a failover/redundant site.

But one key to success is choosing a failover site that best matches your availability needs and costs.

At a basic level, you want to make sure you're not paying primary site rates for a secondary site. "Remember that the secondary site has the same uptime requirement as the primary," McClelland says. "It just has less probability of being used. And the difference in probable downtime between a dual tier 3 scenario vs. a tier 3/tier 1 option is less than 20 seconds a year."

When searching for a failover site provider, McClelland says,

you need to consider location, site outage history, single points of failure, security, and the availability of extra capacity.

The Little Rock, Ark.-based Mainstream Technologies failover site is in a low-risk geographical location and offers 24/7 physical access secured by two-factor authentication.

Redundancy is key to success. Mainstream Technologies is supported by multiple independent ISPs, McClelland says, and a highly stable power grid. Redundant UPSes, redundant-plus dual-mode cooling, and a backup generator also help

ensure the site stays up and running. For Mainstream customers, it adds up to a long history of uptime, with no unplanned outages in the past four years, McClelland says. **P**

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RackSolutions had those needs in mind when it developed its new 16U Office Cabinet, says Rodger Baldwin, executive account manager. "Small businesses need a cabinet that provides full security, but they do not necessarily have room for a full-sized data center cabinet."

The compact 16U size means the cabinet can fit into small spaces, but it doesn't sacrifice quality or features. It has front and rear lockable doors with large perforation to optimize airflow. In addition, while the doors on many cabinets only open 90 degrees, the doors on the 16U Office Cabinet swing to a full 180 degrees, making it much simpler to install or remove equipment, especially in tight spaces, Baldwin says.

The cabinet's construction includes security features that exceed the requirements of larger data center cabinets,

including secure cabinet side panels and a latch with a key lock. Other standard features include vertical cable management bars and casters for easy portability.

As with all racks and cabinets from RackSolutions, the 16U Office Cabinet is extremely versatile. The new cabinet has a weight capacity of 3,000 pounds and square holes for rack mounting. Additional options include added security in the form of a combination or biometric lock, add-on shelves, rails, drawers, and KVMs. **P**



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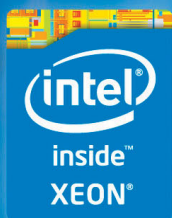
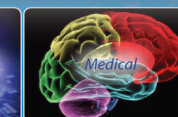
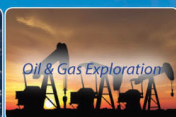
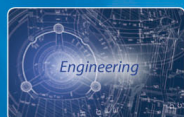
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- Current, Voltage and VA and Watts
- Reliable PCB Power Distribution
- Fail Functional Design



Metered Outlet - MRP

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- Link to Expansion PDU
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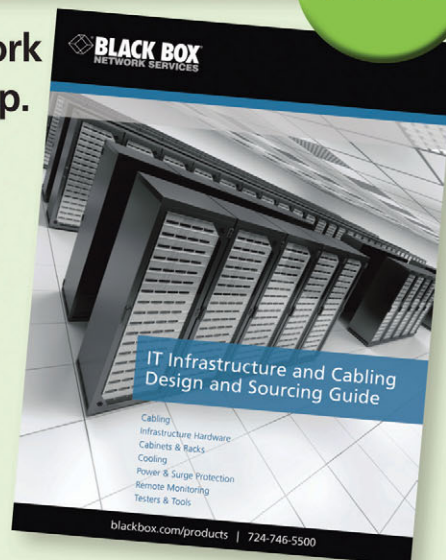
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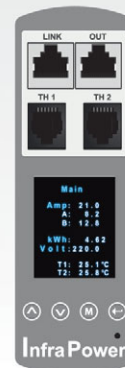
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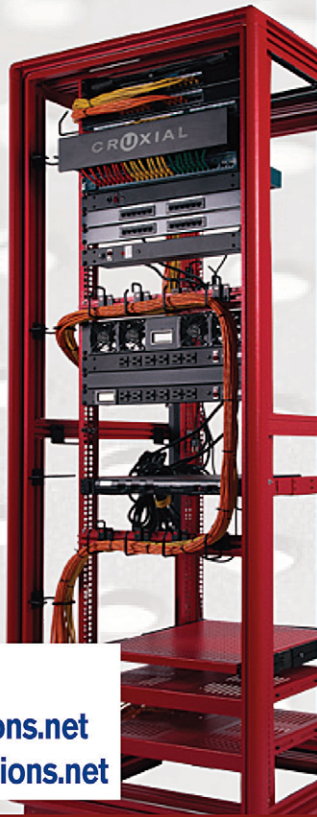
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Volume 7 Issue 30 • July 26, 2013

Problems Drives Idea in Server Technology

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An Easy, Affordable Way To Monitor & Manage Power

Server Technology Sentry Power Manager Provides The

POWER IS STILL KING when it comes to the top concerns data center managers have as they work to keep their data centers, the equipment inside them, and their enterprises as a whole up and running.

Calvin Nicholson, senior director of software and firmware at Server Technology, says there are other concerns, including increased cabinet densities, demand for more computing power, and the need to locate stand-alone capacity. But many of those concerns all center around being more efficient in the way a data center uses its power.

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With SPM's SNAP feature, you put in an IP range and SPM discovers the installed CDU's—regardless of manufacturer or whether it's just a few or thousands—and brings the information back into the SPM interface. You can configure cabinets and locations and get a global view of your data center floor and CDU's or quickly drill down to an individual cabinet or CDU. You can group and cluster outlets together across IP addresses, rows of cabinets, or the whole data center.

Use Power More Efficiently

Server Technology's Sentry Power Manager (SPM) helps ensure you're using power in the most efficient way possible. SPM's capacity planning and predictive features help you spot stranded capacity and help you know if and when you might run out of power.

"If you're not monitoring power, how do you know how much you're using compared

to availability," he says. "If you have available capacity, you can put off a decision that could cost you thousands of dollars for color space or up to millions of dollars for a new data center build."

Sentry Power Manager provides a way to measure, monitor, and trend data center power information in one central location. The product comes in both a standalone appliance and virtual version.

Make Information Decisions

Using the dashboard, you can configure your own NOK view, and alerts to see on the main screen. Different power back capabilities and NOK views can be configured to suit your needs. You can also set up alerts to see on the main screen. Different power back capabilities and NOK views can be configured to suit your needs. You can also set up alerts to see on the main screen.

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"If you're not monitoring power, how do you know how much you're using compared

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■ Gartner Identifies Technology Trends For 2014

What technologies will impact your business next year and beyond? Analysts at research firm Gartner answer that question with this list of technologies they believe have a high potential for disruption to IT or business, a need for major dollar investments, or the risk of being late to adopt.

Mobile device diversity and management. Enterprises with bring your own device policies need to thoroughly review those policies and, if necessary, update and extend them. Policies should clearly define what employees can and can't do.

Mobile apps and applications. Apps, which are smaller and more targeted, will continue to grow, while applications, which are more comprehensive, will shrink.

The Internet of everything. The Internet is expanding into enterprise assets such as field equipment and consumer items such as cars and televisions, Gartner reports. Is your enterprise operationally and organizationally ready?

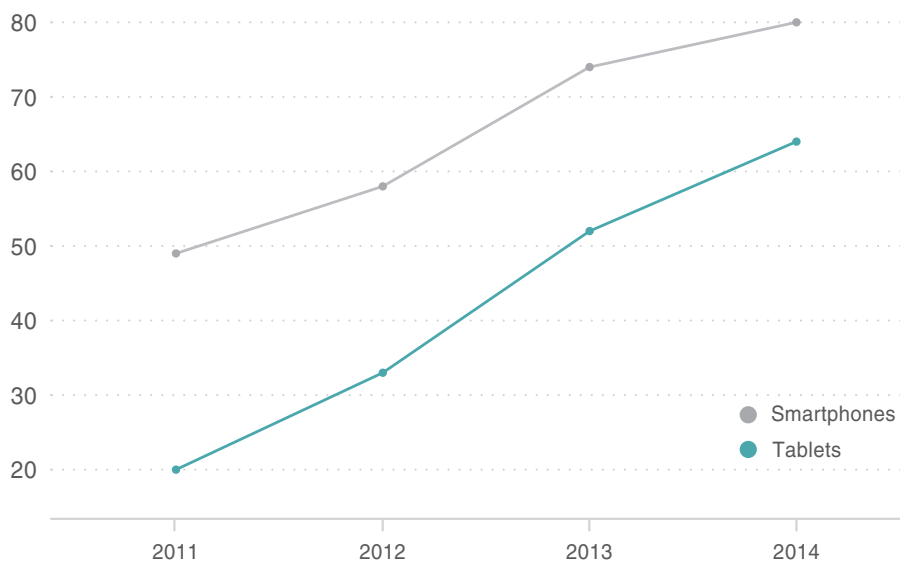
Hybrid cloud and IT as service broker. Enterprises need to work to bring together personal clouds and external private cloud services.

The era of personal cloud. Power shifts away from devices and toward services. The personal cloud will serve as the primary hub, with the need to manage and secure content in the cloud rather than focusing solely on the device.

■ Smartphone, Tablet Ownership Levels Reach New Highs

Smartphones have become the norm, and tablets are quickly entering that category, according to research company Frank N. Magid Associates. This year, 74% of mobile phone users in the United States owned or used a smartphone, up from 58% last year. More than 50% of mobile phone users owned a tablet, up from 33% last year. Here's how the ownership levels have changed in recent years:

U.S. Smartphone vs. Tablet Penetration, 2011-2014
(% of total mobile phone users)



■ Organizations Should Plan For An Infinite Data Center

Data center managers will need to invest in computing and storage capacity over the next several years to keep pace with increasing business demands. Although the conventional thinking would be to also add more data center floor space, power, and cooling, Gartner analysts note that may not be necessary. "The first mistake many data center managers make is to base their estimates on what they already have, extrapolating out future space needs according to historical growth patterns," says Gartner research vice president David Cappucco. "This seemingly logical approach is based on two flawed assumptions: that the existing floor space is already being used properly and usable space is purely horizontal." Instead, data center managers should rethink the floor plans and cooling and server refreshes, Gartner notes, aiming for an Infinite Data Center that can meet growing business needs indefinitely without increasing footprint.

■ Forrester: U.S. Tech Market Stuck In Second Gear

Concern about renewed deadlock in the federal government will constrain economic growth and tech buying for the rest of this year, says Andrew Bartels, vice president and principal analyst at Forrester. The sequestration's cuts in federal spending, federal government shutdown, and last-minute increase of the federal debt ceiling "have kept the U.S. tech market stuck in second gear," he says. As a result, Forrester now predicts that spending on information and communications technology goods and services in the United States

will grow just 3.9% this year, down from its earlier prediction of 5.7% growth.

■ Worldwide Software Spending Showing Signs Of Recovery

Enterprises are seeing new opportunities to leverage information they have to drive new and improved products and services, says Henry D. Morris, senior vice president for worldwide software, services, and executive advisory research at IDC. As a result, he says, software to manage, access, and share information continues to be a priority and driver of software market growth. That spending has contributed to worldwide software spending increasing 5.5% year-over-year during the first half of this year, according to IDC. Compared to the 5.1% growth during the first half of 2012, IDC notes, we could be seeing a sign of recovery. IDC reports that all three primary software market segments showed between 5 and 6% growth during the first half of this year.



■ Large Enterprises Head For The Hybrid Cloud

Research firm Gartner says that about half of large enterprises will have invested in hybrid cloud computing by the end of 2017. This marks a shift in momentum away from big business interest in private cloud initiatives, which, Gartner asserts, offer performance benefits but perhaps not the cost reductions that businesses had hoped for. "Vendors are promoting private cloud computing as 'the next thing' for infrastructure and operations,"

says Thomas Bittman, vice president and distinguished analyst with Gartner, "and it is, but only for the right services." For organizations investing in cloud computing right now and starting small, Gartner suggests choosing technologies that provide ample room to grow and that possess hybrid cloud interoperability.

■ The Shifting Reality Of Cloud Usage

The popularity of cloud computing is undeniable, but what does that mean? A recent CompTIA study identified a few revealing trends that shed light on exactly how organizations are using (and changing how they use) cloud solutions. For example, businesses that shift their cloud usage because of such factors as cost and available features often switch from one public cloud service provider to another. Many businesses also switch from public to private cloud solutions, CompTIA says, often citing security concerns, although many businesses in general use the term "private cloud" too broadly. "Once companies hit a stage where they are using cloud systems as a standard part of IT architecture, they weigh the pros and cons of various providers and models and continually shift to achieve the optimal mix," says Seth Robinson, director of technology analysis and market research for CompTIA.

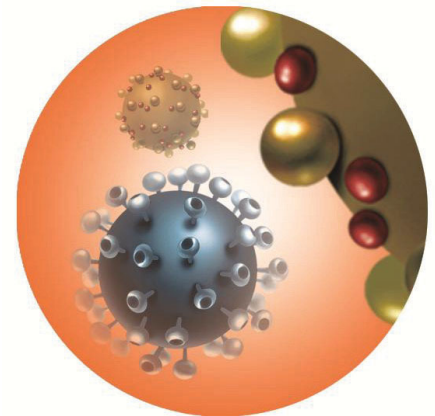
■ Ethernet On Its Way To Becoming A \$10B Business

Outside the world of IT, Ethernet may seem like a static and boring technology, but it is anything but. Total U.S. revenues for Ethernet, which serves as the pipe-work for today's blazing-fast wired networks, are set to increase from \$6.2 billion this year to \$10.1 billion in 2016, according to research firm IDC. "Today, enterprises are increasingly utilizing 100Mb, Gigabit, 10 Gigabit, and even some 40 Gigabit Ethernet services for their domestic and international WAN [wide area network] networking," says Nav Chander, research manager with IDC. Chander says many enterprises are also "upgrading their Ethernet bandwidth and adding more applications and business locations on net because of the

economics and faster time-to-service compared to the alternatives."

■ Significant Growth Ahead For Wireless Infrastructure

The wireless infrastructure market, which involves all hardware manufactured and purchased for wireless network installations and upgrades, is in for brisk growth in the coming years, if recent projections from the Wireless Infrastructure Association hold true. According to that group, private investment in the wireless infrastructure market is likely to produce between \$863 billion and \$1.2 trillion in economic development and create 1.2 million jobs over the next five years. Furthermore, the association's report states, this growth will generate positive side effects, including improved network and mobile broadband services.



■ Users & Mobile Malware: Aware But Don't Care

Although smartphone users are increasingly aware that security products are available to thwart malware attacks on their devices, more than 80% of all smartphones (both company- and consumer-owned) will still be without security software by year's end, according to Juniper Research. The research firm suggests that awareness of the solution differs from awareness of the problem, with users perhaps generally believing that risks are low and security software is too costly. Still, Juniper expects the mobile security software market to grow.

BYOD & Its Impact On The Corporate Network

Strategies For Granting Access To Employee-Owned Devices

ADOPTING A BYOD policy that enables employees to bring and use their own mobile devices in the workplace opens up any number of potential benefits, including the likely possibility that employee productivity will increase.

But implementing a BYOD, or bring your own device, policy also presents numerous potential headaches for IT, including issues related to those devices accessing the corporate network. Knowing what possible issues you'll face, along with strategies to grant network access, can help ensure you'll be able to manage secure access.

Know What To Expect

Plenty of information has been produced in recent years documenting the positives of allowing employees to bring their devices into the workplace.

Plenty has also been written concerning the need to implement a strong, well-thought-out BYOD policy first to address the numerous issues created by a BYOD strategy.

Rob Enderle, president and principal of The Enderle Group, says the most common issues involve access, setup, and interoperability. Of these, Enderle says access is likely the most important, as a user can cause the most damage by using a device in an unauthorized fashion to access information or do harm.

"Assuring that the introduction of a new device doesn't compromise security, either physical (camera or microphone) or electronic, becomes the greatest priority as a result," he says.

Christian Kane, analyst, enterprise mobility, infrastructure, and operations at Forrester Research,



says data security is absolutely the most important issue concerning network access.

"It's really all about access to the internal network and corporate resources. Every new device that comes in is Wi-Fi-enabled, and users have credentials to get into that network," he says. Companies previously allowing notebooks and Wi-Fi access "now have to deal with a huge amount of new, unmonitored, and potentially unsecured devices trying to connect."

Beyond security issues, companies may need to deal with capacity issues on their internal networks as more devices begin entering the workplace and connecting to the network. This issue, he says, can be somewhat influenced by tiered data plans from carriers.

Don't Put Your Company At Risk

When forging a company stance toward BYOD and network access, Enderle says it boils

down to not putting the integrity and assets of the company at excessive risk. Additionally, the benefits of allowing network access should exceed the likely liabilities, he says.

Kane says a "free-for-all" approach isn't advised because of issues such as data security. Many tools are available that grant IT better access control over networks, he says. "Companies should allow only approved devices with the proper security configuration onto the network," he says.

Individual companies may have their own nuances in their security policies, he says, but they must understand the associated risks of allowing network access to unsecured devices. This doesn't mean companies should block all BYOD traffic, he says, as employees often seek access to be more productive. "If companies offer a secure way for these devices to connect to resources and also offer guest network access for unsecured

Discover The Device

Using a mobile device management (MDM) solution is one way to uncover information about a device's history, the data on it, and its general stability, says Christian Kane, analyst, enterprise mobility, infrastructure, and operations at Forrester Research.

"For history, there really aren't that many tools available, which makes things difficult. You also get into tricky issues around employee privacy. The same really goes for data," he says.

"There are some better data controls available, but more often these days, attention is being focused on control, history, and flow of corporate data to the device rather than what's on there as a whole."

devices, they can often cover the majority of these use cases,” Kane says.

Weigh Platform vs. Owner

A question that IT will likely ponder is what is more important when it comes to network access: the device’s platform or who owns the device.

Kane believes we’re at a place where both are important, but he leans toward who owns the device. Though differences among platforms exist, he says, “they aren’t as major as who ultimately controls [device] usage. With a corporate-owned device, you set the environment, and the user can only do so much. With BYOD, it’s really somewhat of a compromise but with the end user in ultimate control.” Kane says it isn’t the end user’s job to focus on IT and security, thus the user likely won’t be as dedicated to doing so.

Enderle says the answer comes down to control and assurance. IT should base its choice on whether it can reasonably secure the device, he says. “If this means they have to take control of it, then that becomes a requirement, but this has to be about security and not about a typical management need to control everything they touch regardless of need. Line managers and employees can generally tell the difference.”

A platform such as Android, Enderle says, will likely require

a high level of control, as it is easily rooted. Further, Enderle says, some Android vendors (such as unlicensed foreign dealers) “should be barred outright because their phones likely have already been rooted prior to the user acquiring it.”

Manage Mobile Devices

IT has numerous strategies to consider when granting network access to a variety of devices. Kane says deploying mobile device management (MDM) tools can help manage the flow of data and address some connectivity issues related to BYOD. “Using proper networking tools that monitor traffic and potentially using a guest network should cover major issues,” Kane says.

Enderle says another possibility is using a whitelist

network access process in which “each device is allowed on a case-by-case basis based on company policy and the ability and resources available to assure its security.”

Companies can charge this resource back to the line department providing a path to access but should ensure the line manager can verify the cost is worth the benefit. **P**

Limit Access

Rob Enderle, president and principal of The Enderle Group, says managing all the devices that are accessing the corporate network is generally something best done using a comprehensive toolset.

“Few devices are configured for dual-factor authentication, which means it’s always likely a device could be used in an unauthorized way from a hostile entity that found or stole [the device],” he says. “This means perimeter security won’t be adequate, and the security solution will need to be pervasive and assume the perimeter will be penetrated. It also suggests that access to very secure systems should be very limited from mobile devices and only allowed if there’s no reasonable alternative of a more secure client device.”

BONUS TIPS:

Treat Users Differently

Depending on the enterprise, IT must deal with different compliance requirements and data-handling procedures. Although some users need and want access to sensitive data, this isn’t true of all employees. Some may only need access to corporate email, certain applications, or information not involving

sensitive data or intellectual property. One approach for granting access to sensitive data to those who need it is allowing only on-premises access (not remote access) via the organization’s wireless network.

Block The Jailbroken

When contemplating strategies for uncovering information about a device prior to allowing network access, Rob Enderle,

president and principal of The Enderle Group, suggests blocking jailbroken devices. He also advises running a scan for known malware and determining if security software is installed. “In addition, access should at least be two-factor, helping to assure the person using the device is authorized to use it. Keyloggers represent the greatest threat, and assuring one isn’t running is a big requirement,” he says.

Reclaim Server Resources

Improve Efficiency & Utilization Effectiveness Without Hurting Performance

NEARLY EVERY DATA CENTER strives for the highest level of efficiency. And although many companies are taking strides to maximize their available resources and improve server utilization effectiveness, there is always more that can be done.

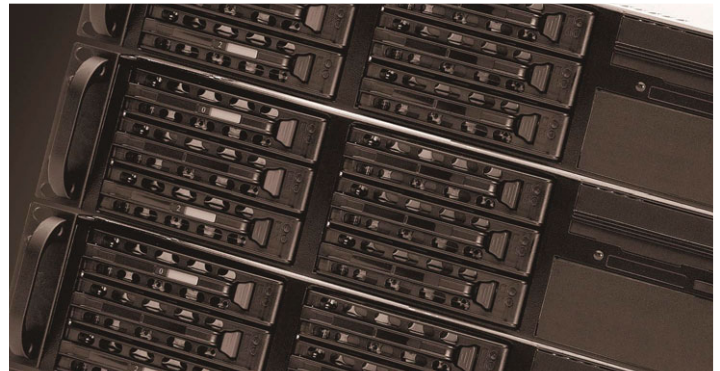
In some cases, you can simply change your approach to server utilization and improve efficiency, but in other cases, you'll need to spend extra money upfront on new servers to cut costs. Regardless of the approach you choose, you'll need to make sure you maintain a balance between performance and efficiency so you can save money and improve the end-user experience.

Strike A Balance

The problem with focusing only on energy efficiency or server utilization is that you may neglect other areas. Greg Schulz, senior advisor with the Server

and StorageIO Group, says you could run a server at high utilization, but you may impact overall performance. You may be maxing out all available resources, but users may complain about how slow everything is, he says. "I've achieved my objective of getting high server efficiency, but what about effectiveness?"

You can also focus too much on efficiency and opt for lower power modes for servers at the wrong times. "Maybe I don't focus on that high utilization and run it at a low utilization rate," Schulz says. "In that quest to become efficient, you could actually introduce new bottlenecks. If we're focused on energy savings, I might put the server into an energy-saving mode, which may put it into a low performance mode. I'm hitting my energy economic budget objective, but I'm missing out on performance."



More Virtualization

The best way to improve server efficiency and utilization effectiveness is to implement virtualization wherever possible. In fact, Nik Simpson, research director at Gartner, says that most companies should be shooting for at least 70% of server loads to be virtualized.

"If you're a long way below that, you're leaving a lot of money on the table not just in terms of energy, but also you have way more servers than you need; you're not getting the management efficiency that virtualization brings," he says. "That's your first step toward server utilization efficiency."

Dave Bartoletti, principal analyst at Forrester Research, agrees that a majority of workloads can be virtualized. "And that means consolidation onto fewer servers for efficiency, but it also means a dramatic improvement in operational efficiency," he says. Not only can you ensure that you are

Key Points

- Virtualize as much as possible to maximize your available resources and drive up overall server utilization.
- Manage your server life cycles to make sure you aren't behind when it comes to efficiency and performance.
- Make sure performance and efficiency are in equilibrium to prevent potential issues.

saving on energy costs by having a lower overall server footprint, but you can also improve efficiency and performance for the sake of your employees.

"Virtual workloads can be duplicated easily, moved while running, backed up easily, balanced across multiple server clusters based on demand, and resized easily," Bartoletti says.

"All the benefits of encapsulation of workloads and consolidation keep increasing

Get Started

Greg Schulz, senior advisor with the Server and StorageIO Group, says that one way to tell whether your servers are running well and efficiently is to listen to users. They may be complaining about applications that are running slow or pages that simply won't load. This could be an indicator of inefficiency. However, Schulz warns that you shouldn't take these complaints at face value. "The first step is to validate complaints," he says. "Is what users are seeing normal or not? Is it consistent? If not, use that information to figure out the problem. Where is the bottleneck, and what's causing it?"

as more and more business-critical apps can be safely virtualized. Beyond server utilization, there's gold in your virtualized environment if you take the time to continually optimize your virtual machines. Don't throw money away on a static virtual environment—explore how you can drive more efficiency, performance, and availability using advanced virtualization features.”

Manage Server Life Cycles

Next to virtualization, implementing new server technology at the right time is also a crucial aspect to maintain the proper level of server performance and efficiency. Simpson says that he's been in data centers where they're still using servers long after the five-year life cycle that is considered quite conservative. Many companies, he says, are moving to a three-year life cycle on servers, particularly in virtualized environments.

One of the main reasons for the three-year life cycle is that virtualization makes it much easier to upgrade hardware. “In the past, you had to go and rebuild the entire server environment, install the operating system and applications, and make all of the tweaks that you made to it over the years to make it run the way you want it,” Simpson says.

“In a virtualized environment, with something like live migration, you add the new

server into your virtualization cluster, migrate the workloads onto it, turn the old server off, and you're done. That enables more aggressive hardware refresh cycles, and very often you can get payback on the three-year life cycle just in terms of energy improvements.”

On the other hand, for companies that can't necessarily afford to upgrade servers that quickly, Bartoletti says higher efficiency can mean longer life. He says that if you can “continually improve efficiency and back more workloads onto each server, you can prolong or delay new server purchases.”

If you have a limited refresh budget, then make sure you take advantage of new approaches and new software to drive up efficiency and extend your server life cycle. **P**

Action Plan

Spot possible bottlenecks. Make sure you listen to your users to determine whether server performance is as good as it could be. Establish an efficiency baseline and make sure you always have enough resources available for mission-critical applications.

Speak with vendors. Talk to your established technology partners to find out if they have new hardware or software solutions that can help boost efficiency.

Update or upgrade infrastructure. If you can't remove these bottlenecks using your existing equipment, consider upgrading it and implementing more virtualization so you can take advantage of less expensive commodity hardware that also sports energy-efficiency features.

Track your changes. If possible, monitor your server performance. Use established baselines to determine whether your changes have the desired effect.

Top Tips

Awareness. Greg Schulz, senior advisor with the Server and StorageIO Group, says that it's important to have an in-depth view into the environment to know that just because a server is running at high utilization, there may be a performance bottleneck. You need awareness and insight to know how certain changes will either affect efficiency, performance, or both.

Use smart technology when possible. “Leverage modern servers that have intelligent power management and use energy-saving modes,” Schulz says. “Use turbo modes when possible to boost performance, but also let servers go into a slower mode when there's less work to be done.”

Don't push your luck. Dave Bartoletti, principal analyst at Forrester Research, says that how hot you run servers depends on how much risk you're willing to take. He says that for “well-understood workloads with reliable load, you can safely drive up utilization,” but for “spiky workloads or business-critical apps, you might run cooler to reduce the impact of any individual server failure.”

Dispose Of Old Smartphones, Tablets & Mobile Devices

Special Considerations To Protect Yourself From Security, Legal & Environmental Risks

ENTERPRISES HAVE BEEN tracking and disposing of old servers, desktop PCs, monitors, and other equipment for years. Only more recently, however, have IT staffs had to tackle the disposal of smartphones, tablets, and other mobile devices, which can pose special challenges, particularly considering their typically quicker refresh rate.

Properly disposing of mobile devices is imperative for many reasons, including security (most devices contain personal or business information), environmental (preventing devices from ending up in landfills), legal (complying with data regulations), and financial (there's a good chance to make some money back). Here is advice for safe and secure disposal.

Know What You Have

Many processes IT managers already use to audit, track, and

dispose of laptops and desktops can also apply to mobile devices. If necessary, says Sandi Conrad, senior consulting analyst at Info-Tech Research Group, IT can log device serial numbers in a spreadsheet, though a better route is using a mobile device management (MDM) or IT asset-management solution to gather information and track life cycles.

Upon disposal, mobile devices currently tend to have more residual value than PCs. Whereas PC refresh cycles are typically three to seven years, mobile devices are refreshed every one to two years, Conrad says. "We see [mobile devices] replaced much more quickly, even within the corporate space," she says, thus a generally greater opportunity to resell them.

Michael Morgan, senior industry analyst at ABI Research, agrees. "At a ratio of value metal that can be smelted



down by the ton, you can actually make some of your money back," he says. "You have to pay someone to take and break down your old computer. Somebody will pay to take your old cell phone away." This difference gives cell phones and mobile devices "a chance to be much more green than the PC and laptop experience," he says.

Enterprises can try to resell their devices themselves, but it may prove counterproductive. "It really depends on what business you want to be in. If the business you want to be in is selling used equipment, then go for it," Conrad says. However, the overall resale market currently is huge, Conrad says, and "from a corporate perspective, selling those phones through whatever channel is a lot of work with potentially a lot of headaches."

Seek Help

Because of the time and complexity involved in reselling equipment, including

Key Points

- The potential to make money back from old mobile devices is now greater than with PCs.
- It's possible to resell your own used mobile devices, though it can require significant time and knowledge.
- Ensure asset disposal companies can provide detailed audits of how mobile devices are handled, including how data is wiped.

dealing with overseas channels, many enterprises are better served by hiring an IT asset disposal company.

There are plenty of options, Morgan says, so seek an experienced company with established best practices and certifications and one that follows guidelines set out by the recycling industry. Among other things, Morgan says, determine where the company sends devices for recycling that it can't refurbish. "There are

Get Started

When disposing of mobile devices, you may be able to use the IT asset management solution you already have in place. If you don't have one, use a spreadsheet to record device serial numbers and track device life cycles. A better option is implementing a mobile device management (MDM) solution or asset management system, which can generate reports to show devices were disposed of properly if the need should rise. If using an IT asset disposal company, check that it can track devices by their serial numbers and provide documentation that devices were disposed of responsibly and according to federal and state laws.

certain folks that just take this stuff and ship it overseas” where locals, including children, rip devices apart to access the valuable metals inside. “So you’ll have children burning tires to create a fire to melt the plastic off the wire to sell the cooper. And none of that is good at any level,” he says.

Though some companies specialize in mobile devices, Conrad says, most established IT asset disposal companies also handle mobile devices.


Generally, you are likely to encounter two types of companies, she says. One group supplies new devices but offers to take old ones away free. Such companies may not have contracts specifically covering disposal, meaning enterprises won’t know the ultimate fate of their used equipment and if laws are being followed, Conrad says. Such companies may not perform device data wiping.

The second type is the true IT asset disposal company that audits how devices were resold, dismantled, recycled, or disposed and reports the profits the enterprise has coming.

“These companies have very specific contracts,” Conrad says. “They guarantee the wiping of drives and that equipment will be disposed in an environmentally appropriate manner. So as a manager or CIO, you have the comfort level that this isn’t going to come back to haunt you,” she says.

Ensure Data Is Wiped

As with PC disposal, it’s vital to thoroughly wipe data from mobile devices. Whereas doing so with PCs generally involves pulling drives and using multiple governmental-level wipes, this “tends not to be handled in the same way for phones,” Conrad says.

It’s easy to think that because smartphones and tablets use flash storage, simply resetting devices to factory settings is all that’s necessary, Conrad says. “But there’s still resident data on there that needs to be cleared off,” she says. Here, an MDM solution or IT asset disposal company can help. An additional benefit of using MDM solutions is the ability to remotely wipe data if an employee should lose a device, she says. 

Action Plan

Track. Make certain to track all mobile devices by their serial numbers within an IT asset management system, MDM solution, or at minimum, a spreadsheet program.

Wipe. Ensure that data is properly wiped from all used mobile devices beyond simply resetting the devices back to their original factory settings. A mobile device management solution can help.

Inquire about incentives. Ask your mobile device operator what take-back programs it has in place and what incentive programs it provides customers regarding new device upgrades.

Hire some help. If you’re outsourcing asset disposal, contract with a certified, experienced IT asset disposal company that has well-established and clear best practices in place and can perform detailed audits and report specifically how and where devices were refurbished, resold, or recycled.

Top Tips

Use available resources. One resource IT staffs can turn to for guidance is the Asset Disposal and Information Security Alliance (ADISA), a UK-based organization that consists of experts who specialize in risk management, compliance, and data protection within the business process of IT asset disposal.

Ask your operator. ABI Research senior industry analyst Michael Morgan advises initially talking with your enterprise’s device operator to see what take-back services and incentives it possibly offers in association with device upgrades. “They want to reward you for [proper recycling] because they win in green image, and they win in customer loyalty,” he says.

Generate good publicity. Your enterprise may be able to generate some positive publicity by creating its own mobile device take-back campaigns in the community, opening up the campaign to local citizens.

Encryption In The Enterprise

Protect Your Data With Best Practices & The Right Solutions

EVERY COMPANY has sensitive information that needs to be protected. Although you may think that antivirus or anti-malware solutions are enough to protect you from outside threats, remember that not all data resides behind your firewall and that sometimes, insiders can be the threat.

Encryption is essential if you want to protect your data while it's at rest or in transit. But in order to truly benefit from it, you need to make sure you have the right approach.

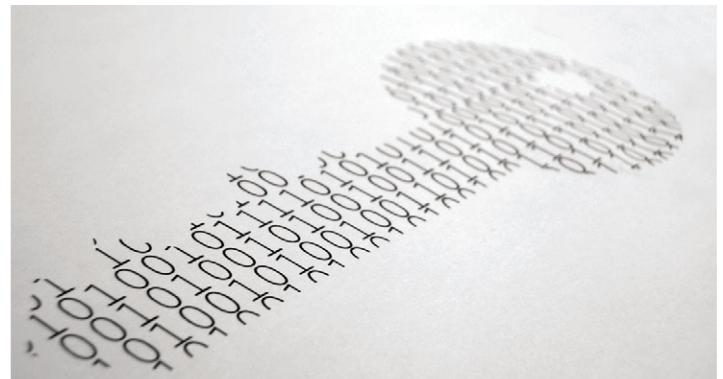
Be Judicious

Hackers are getting better at accessing protected data, which might lead you to believe that you should just encrypt all information within your data

center. But Eric Ouellet, research vice president at Gartner, says there are many reasons why you should be judicious with the data you choose to encrypt.

"If something is encrypted, you can't search it or index it, and it becomes opaque," Ouellet says. "You had something that was visible, now you've just put it in a box, and you have no idea what's in that box, because you didn't label it. You don't want to encrypt everything, so you end up picking and choosing certain elements that you need to protect."

James Quin, director of research at Info-Tech Research Group, says companies should focus on encrypting "anything that is personally identifying, financially-related, and of



course anything that would be considered intellectual property (IP) or a trade secret." Some examples of data that should be encrypted are credit card numbers and customer identification records.

Know Industry Regulations & Company Policies

Always keep in mind that your data may be under certain restrictions or regulations that require encryption. Payment Card Industry (PCI) for financial institutions and HIPAA for healthcare facilities are just two examples of the many regulations that cover certain industries.

Ouellet says following these and any other applicable regulations is absolutely critical, but that they only tend to focus on sensitive identifiable information for either customers or patients. For that reason, you'll need to develop your own internal policies for what other types of data you might want to encrypt.

Ouellet recommends encrypting soft IP data, which could consist of "internal documents about a sales process or a process followed internally to build a product" as well as a hard IP, which could be a specific chemical formula for a product or similar information. Determine what data is most important to your organization and make sure it is protected.

Choose The Right Solutions For The Right Purpose

There are many different types of encryption, but Ouellet says the most important thing to remember is that "not all encryption works with all different types of datasets."

For example, full disk encryption is really to protect hard drives such as those on a laptop. "That's really the intended use and purpose for that, but it's not intended or geared toward being able to protect data in transit, because that's not how it's applied," he

Encryption As A Last Line Of Defense

Although it's important to encrypt data and prevent access to sensitive information, it's equally important to remember that encryption shouldn't be your be-all, end-all security approach. In fact, according to James Quin, director of research at Info-Tech Research Group, encryption should be your last line of defense.

"By the time you are relying on [encryption], all of your other defenses have either failed, in the case of encrypted data housed somewhere on your network, or never existed, in the case of a laptop that is outside of the corporate environment," Quin says. "Last lines of defense must be strong because once they fail, there is no other protection. Ensuring that encrypted laptops are powered down rather than just asleep when not in use and that keys are strong, and passwords complex, are essential steps."

says. He also points out that while some solutions may use the same type of cryptography, whether it's AES or another method, that doesn't mean that the same solution can be used for database encryption and laptop disk encryption.

Full disk encryption is used to encrypt an entire drive and all of its contents, but Quin says there are also some file- and folder-based encryption solutions that only encrypt portions of a hard drive. In addition to those solutions, you can also find self-encrypting drives that can be used in computers, servers, and storage arrays.

With so many options available, Ouellet says that the key to proper encryption is to determine "what you want to do as an organization, build out the various buckets [of data] that you need encryption for, and then find the tools that meet those requirements."

Consider External & Internal Network Encryption

Encryption is often focused on data at rest, but you also need to use encryption to protect data in transit and your network as a whole.


"Diligent organizations will look to provide encryption for all of the various storage locales, whether they be endpoint devices or data stores like network drives and

databases, as well as network traffic through the use of internal VPN tunnels, which essentially build an encrypted pipe through which data traverses," Quin says.

VPN connections can be used to further encrypt data sent over the network from the company to the remote worker and vice versa. Companies can also use this form of network security to encrypt packets of information sent from one organization to another.

Network encryption can further secure data, Ouellet says. "Sometimes you'll have an internal process where you have a server of some sort that's communicating with another server resource internally, so maybe you have a data processing server communicating with a back-end server

to get some information and then it forwards it to another application server somewhere else. That would be an example of where you would have internal network encryption."

By combining internal and external network encryption, you can protect your data regardless of its location and throughout the entire transmission process. 

Keep Track Of Your Cryptographic Keys

Eric Ouellet, research vice president at Gartner, points out the importance of backing up and managing your cryptographic keys. "If you lose the key, the data is shredded and you'll never get it back." Vendors design encryption solutions so that "there are no backdoors," Ouellet says, so without the key you used to encrypt the data, you could potentially lose access to your data.

"A lot of the organizations I talk to say they're going to figure out all of the bits and bytes and all of that stuff, but they forget about the long-term process," Ouellet says. "They might be living with this cryptography for the next five, 10, or 20 years, depending on what it is they're doing. It's important for them to be able to maintain currency over the long term so that they can ensure they have access to the data whenever it is that they need it."

BONUS TIPS:

Protect Data From Loss

"Encryption is about protecting data from loss, and while it is a useful solution, it is far harder to lose data if it is never in a position to be lost in the first place," says James Quin, director of research at Info-Tech Research Group. "As such, IT leaders and enterprise users should always be asking themselves whether sensitive information needs to be put on to

laptops or USB keys to be potentially lost in the first place."

Understand The Options

A number of hardware and software encryption options exist today. Encrypting data at the drive level, for example, can offer capacity and performance boosts. There are also a variety of encryption applications available, and most are geared toward protecting data at a certain level. For example, file

or folder encryption can lock down data at that level, while database encryption is geared toward protecting those particular areas of a corporate data warehouse. In addition, some companies have attempted to implement internally developed encryption strategies. Although this method isn't widespread, it does occur in the industry and is almost never as secure as commercially approved methods, experts note.

Make A Plan For Big Data

Important Steps To Take Before You're Ready To Store & Process Vast Amounts Of Information

BIG DATA is a challenging proposition because it deals with massive amounts of information and requires a range of solutions for analytics. But because big data is a relatively new technology, it's the perfect time to start researching potential approaches and determine whether you're ready to embrace it. Fortunately, there are resources to take advantage of and, for many organizations, a clear path to follow.

A Variety Of Use Cases

Big data analytics is only limited by a company's imagination. For example, search engines and large online retailers use some form of big data analytics to sort through vast amounts of information and return recommendations for users.

"The first use of big data today is trying to understand client behavior so that you can better target clients and guide them toward the things you have to

offer," says Jean-Pierre Garbani, vice president and research director at Forrester Research.

But big data can also be used inside the data center to optimize performance and improve overall efficiency.

"Let's say you have 1,000 servers in your infrastructure, and you've established certain rules for deploying virtual partitions," Garbani says. "You're going to say a VM is typically two processors and so much memory. Each time someone comes in with a virtual machine, you're going to partition that environment. If you look at all the data that you have and are capable of analyzing it, you may come to the realization that in fact 99% of your applications are not using all of the capabilities of the VMs and that you are in fact allocating too much memory, too many processors, or maybe not enough."

Using insights gleaned from big data could help you reduce



the number of servers in your data center and aid in consolidation. Or, you could use big data to determine which applications your employees use most often. You could then decide to end the subscription to a certain service or renew your subscription to another.

The key is to focus on how you want to use big data and what you hope to get out of it, so you can test it that way from the beginning and prepare yourself for a full-scale implementation in the future.

Key Points

- Know the most common use cases for big data and pick the one that best fits your organizational needs.
- Use stored data and data streams as starting points to determine your hardware and software requirements.
- Big data is a unique technology that may require server, storage, or network upgrades for proper performance.

Get Started

"The biggest thing enterprises are missing today is not the infrastructure or hardware; it's the skilled resources," says Stewart Bond, senior consulting analyst at Info-Tech Research Group. "People who are very knowledgeable with big data technologies and know how to use them are few in number and hard to find," he says. Some programs are available to train data scientists and make them available to data centers. But it's important to remember that it takes a team of people who understand not just data science, but other areas of data collection and analysis.

Data, Then Infrastructure

Stewart Bond, senior consulting analyst at Info-Tech Research Group, says with traditional data architecture, the data models and locations and how that data is used is a function of the application that is being built. In other words, the hardware requirements dictate where and how data should be stored.

But in big data architecture, it's the opposite. "The data is where you start, and the data

is what's going to drive all of your other decisions," Bond says. "You start at the bottom and work your way up."

This is a fundamental change in IT operations. Before deploying a big data solution, you have to look at how much data you plan to store and what types of data you plan to use, and then use that information to build out your hardware and software infrastructure to support it. If

you hope your existing infrastructure will be able to handle the big data transition, you may be doomed from the start.

“If you’re going to have terabytes or petabytes of data, that’s going to influence how much infrastructure you need and what you need for fault tolerance,” Bond says. “If you’re dealing with a lot of unstructured data, you’re going to need components that do text analytics and natural language processing. If you’re dealing with streaming data, you’re going to need a component that can capture and analyze it. The variety of the big data and all of the unstructured data really requires new types of data persistence.”

Potential Upgrades

Once you’ve determined how much data you’ll need to store and how you plan to use big data, you’ll need to look at your infrastructure and decide if you need any upgrades. Garbani says it’s a typical capacity-planning type of problem. You first have to establish the capacity available in your data center, he says, and determine whether that capacity is available at all times or only during off-peak hours.

Consider compute, storage, and transport capacity to make sure you can collect data, bring it to the right place, and analyze it, Garbani says. “You need to look at all three aspects of your infrastructure, from network to

compute to storage, and understand whether or not what you have is enough or whether you need to provision and deploy something else.”

Look at all available big data solutions, including open source software that you can use for analytics. “What kind of analytics do we need to do on this data? Are we just doing basic analytics or are we doing advanced data mining techniques and advanced algorithms? That will help influence the types of analytics solutions that you need to put into your environment,” Bond says.

If you’re particularly adverse to open source technologies, he says, “you really need to figure out how to overcome those adversities,” as many “vendor solutions still contain open-source components.” ¹

Action Plan

Human resources. If you don’t have people on staff who are familiar with big data collection and analytics, you may need to seek data scientists through all available avenues and hire a team of experts, especially if you plan to run complicated algorithms with petabytes of data.

Focus. Info-Tech recommends picking a pattern for your big data implementation and deciding if you want to use analytics to reduce costs, minimize financial risk, improve service delivery, or increase revenue. A strong focus gives you a better chance at success.

Test. Start small with your big data system and make sure it works well before moving it into the operations side of your business. An untested big data implementation could overload your servers, storage, or networking solutions.

Seek new sources. Be on the lookout for new data streams you can use to improve your decision-making process.

Top Tips

Why? Jean-Pierre Garbani, vice president and research director at Forrester Research, says that companies have only considered using big data as a tool in data centers for about a year and a half. It’s crucial to research and know how you plan to use big data and what you hope to get out of it.

Sandbox vs. production. Stewart Bond, senior consulting analyst at Info-Tech Research Group, says you need to test your big data strategy in a sandbox before moving it to your production environment. Even though big data was developed to use commodity hardware, he says, you may still end up needing quite a few servers and components to get your big data solutions up and running. Use capacity planning methods for a smoother transition.

Security. “Security is a problem with big data. In paragraphs of unstructured data, how do you know which pieces you need to secure in order to protect someone’s identity?,” Bond says. “There are some new tokenization solutions coming out that are aimed at protecting that data.”

Ensure The Success Of A DCIM Implementation

Key Things To Consider When Moving Through The Typically Difficult Process

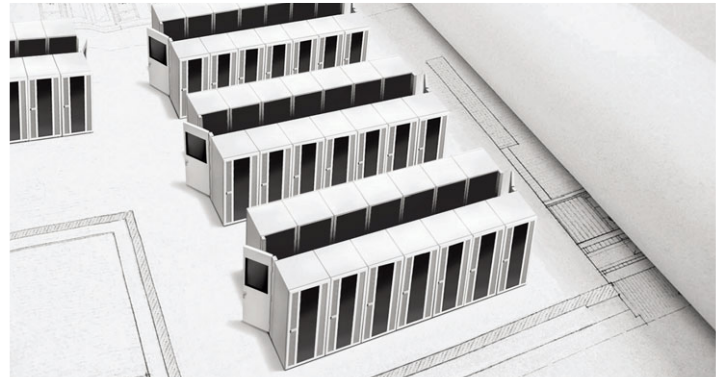
DATA CENTER infrastructure management (DCIM) solutions are proving popular because they help bring all your data together so you can make more informed decisions. But in order to receive those benefits, you have to make sure the implementation goes as smoothly as possible. It's important to consider features, ease of use, and how you plan to use your DCIM solution, but it ultimately starts with finding a vendor that will provide the best possible solution for your data center.

Watch For True DCIM

"There are many vendors describing their toolsets as being in the DCIM space because it is a dynamic and exciting area to be in, but it is often a bit of a stretch," says Simon Mingay, research vice

president at Gartner. "Part of the challenge of the DCIM market is that it remains immature, with a very wide spectrum of providers all coming at it from different directions, including facilities, IT hardware cooling, modeling, and spatial layout of hardware."

Gartner estimates that there are about 25 vendors that fit its DCIM definition of tools capable of monitoring, managing, and/or controlling major data center assets and resources. But about 70 vendors claim to be in the market. That's why Jay E. Pultz, vice president and distinguished analyst at Gartner, recommends companies look for reference accounts whenever possible and "talk to people that actually have it installed and are using it more than in a beta or proof of concept" capacity.



Know How You Will Use DCIM

There is a "lot of talk about all the bells and whistles" when it comes to DCIM, says Jennifer Koppy, research manager at IDC. But organizational buy-in should come before talking features, she says.

"DCIM is extremely powerful and can really support huge business systems," Koppy says. "So I think it's really important to first have buy-in from people on the facilities side, IT side, and then the C-level executives making over-arching decisions. I think having a tool that enables those teams to work together is really the first step if you want to have it be a successful implementation."

DCIM solutions can be used to help make business decisions. With energy management, for example, you can use a DCIM solution to monitor temperature and humidity at the top, middle, and bottom of the rack, Pultz says. This is a "minimal

requirement," however, and "it should do more than just give you a metric," he says. For instance, the tool should be able to do trending analysis or give you a heat map of the data center to identify where the hot spots are, among other features.

A DCIM solution should also be able to help you figure out where to put new equipment. "What typically happens in a data center is, say, 20 servers arrive," Pultz says. "You look around and say, 'Hey, there's some space over there and there's some power, so let's put it over there.' You do that a couple dozen times, and you're very far from optimal in how the data center is configured."

Ultimately, Koppy says, DCIM is such a broad "umbrella collection of tools" that the solution you choose depends on what you're trying to accomplish. "Some implementations are more custom where you pay a lot more in services to get things up and running, and

Aim For Maximum Integration

There's potentially a lot riding on your DCIM solution, so spend time making sure you get the right fit. "The key thing is just making sure that the solution can integrate with the rest of the tools that you have in place, because this is something that can start off with monitoring every little detail in the data center and then that data can feed up into making some pretty big decisions about what you're going to do with the future of the company," says Jennifer Koppy, research manager at IDC.

"To get the true value," she says, "it needs to interoperate very well and play nicely. The free-flowing information back and forth is really a key aspect to those providers that are going to have a great solution as opposed to a good-enough solution."

other DCIM vendors have a lot of standard pre-built templates that speed it up, so you end up paying less for the services and more for the software itself.” Determine what your needs will be from the beginning, so you don’t get stuck with an expensive solution that isn’t what you need.

Opt For A User-Friendly, Layered Solution

Don’t forget to make sure employees will be able to use the DCIM solution you choose. “What we have customers telling us today is that there are so many advanced features, but less focus on how easy they are to use,” Kopyy says. “If you have someone that’s less skilled doing a lot of data input or isn’t familiar with the tool, then they aren’t going to be doing it. The data that you get out is only as good as the time that you spend putting it in.”

Another way to solve this problem is to create a layered DCIM approach where people at different levels of the company only receive information pertinent to them. For instance, Pultz says that many of Gartner’s clients use multiple levels for DCIM so that a “data center operator is getting the most detailed view, the data center manager is getting an overview, and the CFO might be getting a view of how much energy is costing.”

Prepare For Installation


Pultz says DCIM implementation is still not easy. Traditional DCIM solutions were “very manually intensive systems to implement,” he says, and current offerings have improved upon that, but there is still a lot that goes into a DCIM installation.

“You want to make as best use of existing data sources as you can, like an IT asset management system and CMDB and things like SNMP feeds from the major pieces of equipment,” Pultz says.

“You’re also going to have to put in additional sensors to augment the feeds that you have. Those are typically wireless sensors that again measure three points on the racks. The other thing that can happen is you can’t get a data feed from everything, so there will be things like non-smart PDUs, and you’ll need to add things to them so that

you can measure them and estimate them, or not include them.”

It typically takes a couple of months to fully implement a DCIM solution, Pultz says, but it really depends on how much help you receive from the vendor. He recommends you express certain levels of support in the

contract, and make sure you feel comfortable with what the vendor offers before signing. If you can find a vendor that views it as a partnership rather than a standard buyer-seller relationship, the vendor should help make the DCIM implementation process much easier. 

Have The Right Staff In Place

DCIM solutions aren’t necessarily complicated in terms of the types of data they gather, but it can still be difficult to implement and operate one on a daily basis if you don’t have the right experience.

“These are new types of information, so IT operators have to understand what does this mean, what should I look for, what’s a red flag, and how do I integrate this energy and asset data into other things that I have?,” says Jay E. Pultz, vice president and distinguished analyst at Gartner. “Training the operators to really use this is important. If you have a tool, but no one’s trained in it, then it might as well remain in its shrink wrap, because it’s not helping anyone.”

BONUS TIPS:

Implement DCIM In Phases

“This is probably not a one-fell-swoop kind of thing,” says Jay E. Pultz, vice president and distinguished analyst at Gartner. “You want to phase it in. Start with racks where you know that the equipment is well-instrumented and any places that you know you have a

high power density in the rack. When you get up to like 10kW per rack, you want to keep real good track of those things, so you don’t have problems.”

Look For SaaS-Based DCIM In The Future

DCIM vendors typically charge per rack and then calculate one lump sum for the entire implementation, but that could

be changing in the near future. Jennifer Kopyy, research manager at IDC, says that SaaS versions of DCIM solutions should grow in popularity and go to a monthly fee per rack per month or for how much bandwidth is used, rather than the one large up-front cost. “It will definitely make it an easier chunk to absorb and consume for a lot of companies,” she says.

Plan Your Storage Future

A Look At Emerging Technologies That Could Make An Impact

SEEMINGLY EVERY enterprise is staring down the same problem: how to effectively and efficiently store the ever-increasing amounts of data they're collecting and generating.

There's nothing to suggest the mountains of data piling up will slow down anytime soon, which only complicates the matter. And this data will become increasingly vital in terms of making a business more efficient, innovative, competitive, and profitable.

Numerous new and promising storage technologies could change how enterprises approach their storage needs and requirements. These include shingled-magnetic recording (SMR), perpendicular magnetic recording (PMR), phase-change memory (PCM), and heat-assisted magnetic recording (HAMR). Here is a look at developments occurring

in the enterprise storage realm and the impact they could have.

Consider The Old & New

Greg Schulz, senior advisor at Server and StorageIO, breaks newer storage technologies into two essential areas: those that will be ready for "prime time" data center use within the next three years and those that could enter enterprises in three to five years.

Schulz says it's certain that NAND flash-based SSDs, PCIe cards, SCSI over PCIe, and increased use of PCIe 3.0 will occur but to also look for NAND flash with new controllers appearing on DDR4 (DRAM-type interfaces, for example) that some motherboards and OSes will support.

Schulz says PCM could show up in products for early data center adopters later this



year and into 2014, but it is still a few years from broad adoption. "After all, it's taken 20-plus years for NAND flash to get to where it is today, and it's far from reaching its total deployment potential," he says.

Perpendicular recording has been around for several years, Schulz says, but SMR drives will boost the amount of areal density on a given drive. "SMR-type drives should be great for storing large amounts of inactive, or mainly read, data, while driving down cost per capacity," he says.

"HAMR should also help to increase densities further, and when combined with SMR and other things, including the next generation of hybrid drives using a mix of onboard DRAM and SLC [single-level cell] or eMLC [enterprise multilevel cell] NAND flash, will easily keep HDDs around at least into the next decade."

Dick Csaplár, senior research analyst at Aberdeen Group,

says only the largest organizations are currently using these and other newer technologies.

"The No. 1 new storage option is cloud storage, which companies of all sizes can use," he says. "Other new technologies include automated storage tiering; unified storage (a mix of SAN and NAS in the same array); object-based storage, which allows for infinitely large storage farms; and scale-out storage."

But, Csaplár says, enterprises shouldn't "forget about good old tape, as it is seeing new advancements and capabilities in storing large amounts of data, particularly for archiving."

Know The Benefits

Csaplár says many newer storage technologies are helping to meet the reality of greatly expanding storage volumes. "The traditional approach of buying expensive storage arrays, filling them, and then buying another is expensive and difficult to manage," he

Upside, Downside Of New Technologies

The smaller physical sizes of storage utilizing newer technologies could positively impact data centers. For example, Aberdeen Group senior research analyst Dick Csaplár says smaller devices require fewer power and cooling resources, have smaller footprints, and present easier data management possibilities.

A lack of a clear vision is a potential roadblock to adopting storage technologies. "Companies need a master data-management strategy to ensure they're storing only limited copies of the same data—good data and that is worth saving," he says. "Just saving everything is expensive and unnecessary."

says. Object-based and scale-out technologies, however, use lower-cost storage devices that allow for data volumes to grow into the petabytes, while tiering moves data to less expensive storage options as it ages.

Schulz says newer storage technologies will help support and drive more density to enable storing more data and retaining it longer at equivalent or lower costs, including from power, cooling, and maintenance perspectives. Newer technologies will also complement SSD, cloud, virtual, and physical environments, he says.

“Near term, I’m very bullish on HHDD [hybrid hard disk drives], having used them for a couple of years now, and with what we should see in the next iteration of products, they’ll be a great fit and companion to SSDs for both cloud and traditional environments,” he says.

Schulz says SMR drives will be ideal for archiving, reference, or applications that involve significant data that’s mainly read-based. “There’s lots of upside there,” he says. “Further out, combining HAMR with SMR with eMLC and PCM all will help data centers drive density co-existing with SSDs.”

Understand The Potential

In terms of efficiency, cost, performance, and other positives, newer storage technologies hold potential. When

it comes to effectiveness, Schulz says, a solution that uses some SSDs to consolidate IOs, HDDs, and HHDDs while also addressing load balancing, tiering, and data footprint reduction will be a winning ticket.

The quest, he says, is finding a balance without compromising performance, availability, capacity, and energy and without introducing bottlenecks or breaking the budget. Budgets, Schulz says, could prohibit data center adoption of some storage technologies.

“Budgets are certainly a challenge, particularly when thinking in terms of cost per capacity and SSD. For those, think in terms of cost per work done or enabled—how they can boost productivity vs. price of the space,” he says. “Also,

shift from thinking of using new technologies in old ways to how to use new and old tech in new or different ways.”

Be Prepared

Adopting new storage technologies requires knowing your current situation and defining

future needs. “Have a vision, strategy, and plan,” Schulz says. “Do some pilots or proof of concepts to see where the tools or technologies can fit, how they perform or adapt to your environment, and what new rules of thumb or configuration guidelines will be needed.” ■

Look At Cloud Options

Dick Csaplar, Aberdeen Group senior research analyst, points out the strengths of cloud storage and scale-out technologies for making an impact on data center storage needs.

“Most cloud storage is done with object-based to allow for an unlimited amount of data management,” he says. “Scale-out is becoming popular as an in-house storage option.” Particularly for small and midsize businesses, he says, the cloud can provide remote data protection for companies with a single location. “SMBs pay only for what they use and don’t need a capital budget to pay for it,” he says.

BONUS TIPS:

Ensure A Good Fit

Particularly for small and midsize enterprises, a small amount of NAND flash-based SSD storage in the right locations can go a long way when compared to throwing a lot of storage and cash at a problem, says Greg Schulz, senior advisor at Server and StorageIO. Likewise, using a

balance of SSD and HDD or hybrid hard disk drives “is a good strategy, thus look at the hybrid storage systems that support SSD, HDD, and cloud access as part of a solution,” he says.

Don’t Fly Blind

Schulz says although a technology such as SSD “is in your future,” for a successful adoption, enterprises must decide

how much to use, where, when, and for what. Other points to address include which vendor’s products you’ll use and in what configuration. Future storage planning also means knowing your environment, application, and workload characteristics and “having insight and awareness to avoid flying blind or blowing your budget yet not meeting all of your objectives,” Schulz says.

Troubleshoot Servers

Develop An Efficient Process, Follow It Carefully & Keep A Record Of Every Problem & Solution

SERVERS ARE THE foundation of every data center and the backbone of your entire organization. They make it possible to support multiple employees inside of an organization, run applications for business processes and customer service, and much more. If a server isn't running at peak performance, neither is your business.

It's important to understand that no matter how well you run your data center, there will always be failures and other issues that need to be addressed. And while some of them can be prevented, others need to be diagnosed on the spot and fixed in a timely manner. We'll tell you about some of the most common server-related issues and help you develop a troubleshooting process that will prevent downtime and performance degradation.

Know The Common Physical & Software Issues

It can be difficult to pinpoint specific problems with servers. Jason Harlan, operations manager at ServerMonkey (855/477-8377; www.servermonkey.com), says the most common types of physical server issues are with hard drives, CPUs, networking components, RAID, and memory. Harlan says memory failures are particularly troublesome because "they can be the most common failures and difficult to isolate." Memory failures can also disguise themselves as networking or program-based problems, so you have to know what to look for.

In addition to physical equipment failures, you may find that some of your software solutions can fail and cause problems, says Greg Schulz, senior advisor at Server and StorageIO.



"Most server issues outside of power, cooling, or lack of maintenance tend to be software-related, which includes operating systems, drivers, hypervisors, or applications."

Software issues are common and can sometimes be remedied by installing the newest firmware update or installing a newer version of the software. But you may not be able to pin down software as the culprit until you first rule out other potential problems.

Follow A Predesigned Troubleshooting Process

Harlan's memory failure example is a great template to follow during the troubleshooting process. Servers house quite a few memory modules, so the best way to find a problematic one is through the process of elimination.

"A good way to troubleshoot this would be to take the minimum amount of memory it takes to run your server and start by eliminating the suspected bad

DIMM by adding them back one bank at a time," Harlan says. "After you have found the suspected DIMM, replace it with a known good piece. Then, use a memory test approved for the server in question and run it through a complete test to ensure that you have completed the repair."

The process is helpful if you know that the issue is memory-related, but you won't always have that much information. In

Key Points

- Be aware of the usual physical and software suspects related to server performance problems and rule them out early.
- Start by troubleshooting physical components, such as memory, before moving on to software.
- After you've completed the troubleshooting process and fixed the problem, make a note of the fix for future reference.

Get Started

The best way to prevent server problems and speed up the troubleshooting process is to have a monitoring solution in place. Server monitoring software can provide alerts that bring issues to your attention before they become major failures.

Some of the most common issues with servers stem from not having the most recent firmware or patches, so in addition to monitoring server performance, you should also consider an asset management solution that helps you keep better track of your hardware and what updates you have installed.

those situations, you need to start with the usual suspects and then move your way out from there.

Schulz says most server problems or failures stem from changes in “hardware configurations, software or settings, or something in the facilities environment.” Look at recent changes you’ve made to your server configuration and determine whether one of those adjustments could be causing problems.

Companies should also take preventive steps such as running a power on self-test (POST) and monitoring “start-up logs and other event notification entries for signs of trouble that something’s not right,” Schulz says. The troubleshooting process will be quicker if you’re more prepared.


Quickly Isolate & Address The Problem

Once you find the component or piece of software that is affecting your server’s performance, you need to “quickly isolate where the problem is and keep it from spreading or causing a ripple effect on other servers, applications, or systems,” Schulz says.

As previously mentioned, memory failures have a negative effect on networking speeds, application performance, and much more. If you don’t isolate that issue right away, it could affect employee productivity, customer service, and many other business processes.

It’s also absolutely essential to know who is tasked with responding to a specific issue. You may be able to solve the problem with a quick component swap, or you may need to contact the manufacturer for additional help.

If it’s a relatively simple fix, make sure there is a process in place to contact the employee with proper expertise within the organization. If the issue is out of your experience level, don’t hesitate to call the manufacturer or a third-party repair service.

Remember that fixing the problem isn’t the end of the road. Harlan says you need to make a note of what caused the problem and the steps you took to fix it. This information will be invaluable in the future to prevent similar issues or expedite the repair process. 

Action Plan

The following steps were provided by Jason Harlan, operations manager at ServerMonkey (855/477-8377; www.servermonkey.com):

Develop a routine. Before issues occur, you should already have a troubleshooting process in place, know whom to contact in case of hardware failure, and be able to quickly address the problem.

Start with hardware. Troubleshoot physical layer problems by starting at the bottom and checking each layer to determine functionality and compatibility. Eliminate any hardware conflicts.

Move to software. If the problem isn’t at the hardware level, start diagnosing your operating system, software configurations, settings, and updates.

Keep records. Make a note of the problem and the solution to help expedite troubleshooting in the future.

Top Tips

The following tips were provided by Greg Schulz, senior advisor at Server and StorageIO:

Design for failure. Isolate and contain faults from spreading or causing bigger incidents, leverage high availability and redundancy, and plan for workload increases as part of the configuration to keep things running.

Use all available information. Leverage metrics, measurements, incident logs, and reporting as well as automated analysis tools to spot problems quickly and take corrective action. Leverage your monitoring and management tools to spot trends early and plan for growth. Use diagnostics to quickly determine what works and what does not and to improve change management.

Determine your normal performance level. Have a baseline to compare to see what is normal vs. abnormal. Baselines should include performance, response time, server memory, CPU, and network and storage IO activity.

Increase Investments In Virtualization

Determine Where & When Additional Implementations Can Prove Beneficial

VIRTUALIZATION IS NO longer the new kid on the block. According to Timothy Zimmerman, Gartner research vice president, 60% of the enterprises that Gartner talks to have some form of virtualization in place.

Yet even after dipping a toe into the virtualization pool, many enterprises hold off on making further investments for a variety of reasons. One common reason is that management may not see the ROI it believes justifies further investments in network and storage areas, for example. There are, however, some situations where moving forward with projects makes sense.

See Beyond The Marketing

Even though many enterprise data centers have virtualized some component of their infrastructures, Greg Schulz, senior advisor at Server and StorageIO, says there's room for improvement in terms of

the number of organizations investing in virtualization and how much they're doing.

"The key theme here is to visit virtualization life beyond consolidation or aggregation, which has been the initial market focus around cost-cutting and utilization," Schulz says. Such focus has also created bottlenecks, barriers, myths, or misconceptions "that virtualization is only about aggregation, when in fact the bigger and broader focus can and should be around enabling flexibility, agility, elasticity, and resiliency or life beyond consolidation," he says.

Zimmerman says further investments in virtualization can make sense if an enterprise is out of rack space, real estate is limited, or there's an ability to compute more workloads, "which is the server virtualization-type of rationalization."

Although "we're right at the cusp or apex on the compute



side" for implementing virtualization, he says, Gartner is seeing more Layer 4-7 applications becoming VM-capable and the business process and value proposition of utilizing and reducing some hardware associated with those applications becoming more present. "We're probably in the embryonic-type phase of acceptance and deployment of that type of solution today," he says.

Application Considerations

According to Aberdeen Group research, new virtualization of servers has slowed in recent years. Dick Csaplar, senior research analyst at Aberdeen Group, says some reasons include enterprises deploying applications in the public cloud and the difficulty that's involved in virtualizing Tier 1 applications or migrating them from platforms that don't have an easy path to virtualization, such as some Unix or Linux versions.

Aberdeen characterizes Tier 1 applications as large, mission-critical ones (CRM, for example) that tend to consume a server's entire capacity and require high application uptimes.

Aberdeen notes virtualization of Tier 1 apps is as much as 50% lower than Tier 2 apps (employee expense reimbursement, for example) because Tier 1 apps can include older, legacy versions not certified for running on a hypervisor. Also, because Tier 1 apps can consume an entire server's compute capacity, there's not much to gain through virtualization.

Zimmerman says although virtualization might not make sense for such processor-intensive legacy applications utilizing an entire server, and not all applications even need to be virtualized, "you are allowed to mix and match here a little bit, too. Thus, those just wouldn't be servers you would be able to put into your resource pool to allow additional virtualization."

Obtain Private Cloud Benefits

One example where increasing virtualization investments can make sense is developing a private cloud environment. "Private cloud is the new computing architecture and enables much more fine-grained management of the computing infrastructure," says Aberdeen Group senior research analyst Dick Csaplar. "Private clouds sit on top of the virtualized infrastructure, so if you want to take the next steps in managing your data center, then the applications must reside on top of virtualized servers."

Aberdeen Group research shows that even if server consolidation isn't a necessary benefit, virtualizing servers hosting Tier 1 applications can make sense to gain application mobility benefits, such as moving a running application to a new server during periods of hardware maintenance. Allocating more CPU cores or memory during peak demand periods and gaining better application performance monitoring are other potential benefits.

Conduct Proofs of Concept

Both Schulz and Zimmerman say there's merit in conducting tests to see how potential virtualization projects may play out long-term. Schulz says proof-of-concept tests are a great way to determine how virtualization can be used in new or different ways, including determining different rules of thumb or best practices and configuration guidelines to meet various performance, capacity, and availability concerns. Here, virtualization can create clones of production environments without the need for much hardware to test or verify functionality, he says, albeit "without the same performance."


Zimmerman says such smaller test projects help enterprises see how environments will react. "That's one of the biggest benefits, not only in the

applications and then the network, but also their staff can see what happens," he says. "What happens if you move this to over here? What happens when I have this ADC or firewall VM and it gets moved around? Does it have access to the right resources? You're able to do pilots and check in non-production environments in order to continue to learn."

When To Invest

Even if there are good reasons to hold off on more virtualization implementations, there are situations when doing so could make sense. Charles King, principal analyst at Pund-IT, says there generally are three reasons companies decide to abandon conservative implementations for a more aggressive approach to virtualization.

One is when companies find "a new or hitherto unknown technology that will provide better results than what they originally planned," he says. An example of this type of situation is when a processor manufacturer introduces a new lineup. The second reason is companies discover

unrecognized factors—such as IT staff's training in managing x86-based systems—let them capture more value from virtualization than anticipated. The third reason is when companies realize that their original strategy is simply incapable of achieving the goals they targeted, he says. 

Use Your Potential

Assuming an enterprise has adequate hardware resources available—including servers with enough CPU, memory, I/O, storage I/O performance, space capacity, and networking ports and bandwidth, for example—there could be potential to virtualize components without necessarily undertaking major purchases or technology shifts, says Server and StorageIO senior advisor Greg Schulz. If resources are available, companies could possibly reconfigure or leverage them more effectively to improve their usefulness without introducing new bottlenecks or complexity, he says.

BONUS TIPS:

Learn What You Can

Dick Csaplar, Aberdeen Group senior research analyst, says where using virtualization as a learning tool is concerned, selecting a single application or suite can be a very effective way of learning what benefits virtualization could provide. Product test and development is usually a

good option, he says, "as it is very much in demand for certain periods of high demand and then quiet for some time, depending on the product development cycle."

Have A Good Reason To Make Investments

Gartner research vice president Timothy Zimmerman says it's key for enterprises to remember that they shouldn't

engage in a virtualization implementation "just for virtualization's sake." Instead, enterprises should explore what they stand to save by implementing virtualization, both in terms of the business-related benefits possible and determining through testing environments how the data center will react to the implementation.

Clean & Maintain The Data Center

Advice For What Needs To Be Done & When To Do It

HOW IMPORTANT is it to thoroughly clean and maintain your data center on a regular basis? For the answer, simply look at the importance of the data center itself and how much it would cost you as a company should any of the equipment inside your data center go down. Not only that, but having a dirty data center can negatively impact the performance of your equipment, causing it to malfunction or shortening its lifespan.

Avoiding performance degradation is the key to running a long-lasting data center and successful company, but it can be difficult to know where to get started and how to proceed. We'll show you what parts of your data center should be cleaned and maintained, how often, which cleaning tasks can be performed in-house, and when it's time to invest in the expertise of a professional cleaning service.

Understand What Needs To Be Cleaned

Always keep in mind that data center cleaning does much more than keep your physical infrastructure free of dust and debris. It also reflects positively or negatively on your company from both your employees' and customers' points of view.

When beginning the process of cleaning your data center, you should start by looking at every surface, space, and piece of equipment that will need to be cleaned. It's a safe bet that everything inside your data center will need to be cleaned at some point, including racks, shelves, power equipment, light fixtures, flooring, and the under-floor area.

In essence, a solid data center cleaning should leave no stone unturned. It's a good idea to set up a solid cleaning schedule to ensure that your room is clean and equipment will be able to perform at the highest level.

Hardware Cleaning

Hardware cleaning is probably the least likely type of maintenance to be forgotten, but it's important to remember that your valuable equipment is likely where dust and dirt will settle if it's been blown through the cooling system. It's best to wipe down or vacuum the equipment, if possible, to rid it of the dust. Additionally, you should not use chemical cleaning agents on the equipment, because the chemical concentrations may be detected by environmental monitoring systems, and liquid may set off any leak detection systems your data center has in place.



For example, depending on traffic in the data center, you'll likely want to clean the flooring at least monthly. The under-floor area and some equipment, such as UPSes, may only need to be cleaned once a year.

Develop A Maintenance Plan

Having a well-thought-out maintenance plan can prevent and alleviate a fair amount of stress, disorganization, and financial loss related to infrastructure failures. Have a detailed work procedure covering what needs to be cleaned, when, how often, who will be impacted, and what to do in case of an emergency.

Clive Longbottom, service director for business process facilitation at analyst firm Quocirca, advises implementing a data center asset and life cycle management plan. "Use asset discovery tools and then make sure that assets are managed fully from there on," he says. For example, make sure monitoring is present for fans and hot spots

to detect problems early. If possible, use power monitoring at the rack and equipment level to pick up abnormalities before problems occur. Doing so will make maintenance a more planned activity and minimize the chance of unplanned outages, he says.

Clean The Subfloor

Having a clean subfloor can help improve the overall health of your data center. For example, the concrete pad and plenum under raised flooring can accumulate dirt and dust that falls through holes in the data center's flooring. The cool air that circulates underneath the data center floor can carry away that debris and push it into the data center hardware, where the cooling is typically aimed.

Deposited dust can get into circuitry and clog system fans or foul up electronic equipment. Dust in fans can be a particularly dangerous problem for data centers because the reduced airflow can cause

servers to overheat, which can lead to repairs that cause downtime in the data center.

Particulates in your airflow cause other hazards such as an increased fire risk and the possibility that fire suppressants will falsely identify the dust as smoke and release the fire suppressant onto your data center. Employees that are allergic to dust can also be affected by the environment, and a particulate-filled data center can negatively affect the health of IT staff and employees that work inside the data center. In short, an unmaintained subfloor can create environmental, health, and safety hazards.

Regularly scheduled subfloor cleanings can improve equipment reliability. As part of the cleaning, perform a check of the raised floor to find holes and openings in server cabinets to prevent bypass airflow, which can lower efficiency due to decreased under-floor static pressure. The end result of bypass airflow will be hot spots in your IT equipment, so you'll want to seal up those holes in the raised flooring. Another benefit of sealing up the holes is that you'll help to reduce the amount of dust and dirt that falls under the tiles, so you'll spend less time cleaning the under-floor environment.

Keep It Clean

Once your janitorial staff has had a pass and long after the outside cleaning team is

gone, you must take steps to maintain the cleanliness of your data center. Creating a set of standards for your data center workers is one way to cut down on cleaning costs and make future cleanings easier.

You should institute strict policies that determine which employees can enter the data center as well as their expected behavior once they are inside.

For instance, data center employees should take great care not to track dirt and debris into the data center. No food or drinks should be allowed anywhere inside the room or near servers and other important equipment. Plus, you'll want to avoid bringing carts, pallets, or cardboard into the data center as these can damage your flooring and leave behind excessive amounts of dust and debris. In addition, consider using sticky mats near entrances to catch possible contaminants. **P**

Know When To Hire A Cleaning Service

With most data centers tasked with cutting costs, it may make sense to avoid hiring data center cleaning services and try to do everything yourself. But most companies have janitorial staffs that are only experienced in cleaning general office environments. There are certain parts of data centers that should be left only to professional cleaning services.

It's important that you don't rush into choosing a data center cleaning service, because there are multiple factors to consider that may make one firm fit your needs better than another. Not every data center is created equal, and many of them have unique cleaning needs that not all cleaning services can address.

From the start, you should compare the reputations of possible cleaning services and the options they provide. Ask for company references from cleaning service providers and ensure that they have a well-defined process for cleaning the essential parts of your data center. You're hiring these vendors to clean the spaces and equipment in your data centers that you aren't able to, so you should make sure they will do a satisfactory job. Don't forget to also compare the pricing options for different cleaning services.

BONUS TIPS:

Check Your Costs

A lot of factors go into the overall price of a cleaning service, and you should make sure you get exactly what you're paying for. Look at what is being cleaned for the price you pay and the level of cleaning being performed.

There may be specific situations, such as after construction or in the wake of a disaster, where you will need more in-depth cleaning services. One type of cleaning may take more time than another, which could also affect the overall pricing.

Schedule & Verify

Ensure that maintenance

occurs according to schedules and use work dockets to verify everything that needs done is completed, advises Clive Longbottom, service director for business process facilitation at analyst firm Quocirca. "Try to consolidate and then plan so that maintenance is a rolling plan that has the least possible impact on the business."

BUYING TIPS:

Data Center Cleaning Services



A CLEAN DATA CENTER is crucial to the performance of your physical infrastructure and the productivity of your workforce, but you can't rely solely on your janitorial staff to get the job done. For certain tasks, you'll want to hire a professional who can get the job done quickly and with little inconvenience.

Because there's a lot riding on your data center, hiring the best cleaning company—with the right qualifications and experience—is essential. Here's what to look for when hiring a data center cleaning service.

Check A Service Provider's Experience & Reputation

It's important that you don't rush in to choosing a data center cleaning service, because there are multiple factors to consider that may make one firm fit your needs better than another. Not every data center is created equal, and many data centers have unique cleaning needs that not all cleaning services can address.

You should research what cleaning firms offer and also look at their reputation and guarantees. You must make sure the provider has years of training in cleaning data center environments, including floors, ceilings, cases, internal components, and

much more. In addition, cleaning companies should follow ISO 14644 standards, have experience cleaning ISO class 8 environments, and know how to address airborne contamination and particulate migration.

To help narrow your list of choices and assist you in making an informed decision, also find out exactly what services a cleaning firm offers and what kind of quality you can expect. The cleaning service should also be able to provide a detailed list of what it cleans and how thorough it will be.

Understand Your Costs

Cost for cleaning varies depending on what a provider offers as well as its reputation. But don't let price fool you. A lot of factors go into the overall price of a cleaning service, and you should make sure you get exactly what you're paying for.

Be sure to look at what is being cleaned for the price you pay and the level of cleaning being performed. There may be specific situations, such as after construction or in the wake of a disaster, where you will need more in-depth cleaning services than on an annual floor cleaning. One type of cleaning may take more time than another, which could affect

the overall pricing of the service, as well.

Know What To Clean

Some parts of your data center will need to be cleaned annually, while others will require quarterly or biannual cleanings. But it's a fairly safe bet that, at some point, everything in your data center will need to be cleaned. Create a cleaning schedule for the building itself as well as the equipment and stick to the plan.

Make sure your cleaning schedule covers all access floors and floor panels, walls, ceilings, light fixtures, server

racks, UPS units, panels, and more. The best cleaning firms have practices in place that will leave no stone unturned.

Set Clean Policies So Your Data Center Stays Clean

Between cleanings, institute policies that limit the access employees have to certain areas of the data center as well as what they can bring into the room itself. If you can get your employees to treat the data center as a sterile environment and decrease the amount of foreign contaminants, it will make the cleaning crew's job easier and potentially lower your costs.

CHECKLIST

Look for certifications. Check to see if your provider is a member of the Association of Data Center Cleaning Professionals. Also, know what standards, if any, it follows for cleaning.

Understand who will do the cleaning. Require that the cleaning service's employees be background-checked and drug-screened.

Know what will be cleaned. Get a detailed scope of work. What will the company clean, and how thorough will it be? What kind of quality can you expect? Consider creating a cleaning schedule.

Follow up. Periodically check the work in progress.

Make sure the data center stays clean. Decrease the likelihood of foreign contaminants by limiting what types of liquids and/or chemicals are allowed in the data center.

BUYING TIPS:

DCIM Solutions

DATA CENTER MANAGERS are eyeing data center infrastructure management (DCIM) solutions for the numerous benefits they can offer by providing a holistic view of data center and facilities infrastructures. Here are some of the key elements to consider when purchasing a solution.

Know What DCIM Can Do

DCIM solutions enable IT to view real-time power and temperature usage data on a granular level and provide monitoring, management, automation, optimization, and capacity and budget planning capabilities, all of which lead to the streamlining of operations and improving energy consumption and overall efficiency. Along with that real-time, holistic view into power, cooling, and other IT and physical assets, you'll get documentation, control, visibility, and metrics tools all in one solution.

DCIM solutions can replace spreadsheets, paper records, CAD drawings, and similar tools traditionally used to track assets. You'll gain real-time, in-depth views into physical and IT assets because, with DCIM, you'll have a firm understanding of where your infrastructure assets exist and where spare capacity exists.

Other benefits include quick completion of company-required changes; the ability to receive complete capacity data for power, rack units, cooling, chassis, and network capacity

consolidated into one system; less downtime; and precise views of capacity, trend, and environmental data for everyone to access.

Find The Right Product To Meet Your Needs

When comparing DCIM solutions, be sure to consider what your greatest need is and your ability to fully use the platform's tools. For example, determine whether you have the resources in place to address issues the DCIM solution uncovers and change the facility or operating procedures to enable improvements.

The maturing of the DCIM market means there are products suitable for even small enterprises. When evaluating vendors, look for ones that have forged strong links with the leading enterprise IT management vendors. In some cases, your existing power vendors may offer solutions. This would be a good starting point as you already trust them as vendors.

Greg Schulz, senior advisor at Server and StorageIO, says to pay attention to holistic DCIM solutions that expand beyond traditional facilities power, cooling, assessment, and management. Having insight on server, storage, networking, hardware, software, and services, along with a facility's use and service levels, enables making informed decisions on where to deploy



SSD/flash, blade servers optimized for energy-efficient virtualization, and private clouds along with other popular buzzword themes, Schulz says.

Don't forget that, with whatever DCIM application you choose, you need to have the infrastructure support to run and maintain the application, says Alex North, director of business development at BayTech (800/523-2702; www.baytech.net).

Seek An Easy Migration

Rather than re-creating the wheel, seek out a DCIM solution that supports easily migrating existing data to the new system, says Brett Femrite, director of business development at Rackmount Solutions

(866/207-6631; www.rackmountsolutions.net). For example, if you're maintaining multiple spreadsheets, CAD drawings, and other diagrams, he says, "migrating that information into the DCIM solution easily will be a lifesaver."

The solution should allow data center managers to start small and work up to added levels of sophistication in phases, he says. "Flexibility can breed complexity, and while a full-featured DCIM solution can seem complicated, getting started doesn't have to be." A modular solution that enables initially buying what's needed and layering in additional features gradually is a nice benefit. **P**

CHECKLIST

Plan for the future. A DCIM solution should support capacity and optimization planning, offering tools that help "determine future requirements for power, cooling, floor space, rack space, and contingency planning," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Know what you're up against. Possible obstacles to acquiring a DCIM solution can include the company's finance department vetoing the purchase; departments having different solutions in mind, leading to paralysis; vendors not providing a solution priced for the small to midsized enterprise; lack of manpower needed to learn, implement, and oversee the solution; and poor or slow solution support. Before investing in DCIM, know how you'll handle these obstacles.

BUYING TIPS:

Colocation Providers



WHEN SELECTING A colocation provider, it's crucial to get it right the first time, says Darin Stahl, Info-Tech Research Group lead analyst.

"When you get into a colocation, switching costs are enormous," he says. "This isn't like buying a bunch of photocopiers, being unhappy with them, and putting them to the curb and getting new [copiers] in. It's a big deal to go through switching." To find a good fit with a colocation provider, consider the following.

Understand The Options

Stahl says the colocation/managed service provider market can be categorized into three tiers. Tier one vendors typically have significant market influence and enormous geographic scale, he says. Tier two vendors generally have the same qualifications but less market influence and possibly less geographic scale. Tier three vendors are basically everyone else, he says.

Although price is a factor when comparing providers, it shouldn't be the driving factor. Smaller colocation providers that compete on price and don't own their facility typically can't offer an iron-clad SLA around the actual facility, Stahl says.

Lynda Stadtmueller, program director for cloud computing services at Frost & Sullivan's Stratcast division,

agrees, adding, "There's too much at stake . . . to go low bid." Colocation, she says, "is not a commodity; every provider has different configurations, capacity, processes, and systems that can seriously impact your applications."

Consider Usage & Location

Be sure to consider how you want to use the facility and for what purpose. Some companies invest in colocation so they can cut down on internal data center and infrastructure costs while others hope to set up a safe solution for disaster recovery. Once you know how you intend to use equipment in your colocation environment, you can then find the best location.

Know The Reputation Of Your Provider & Its Facility

Checking a colocation provider's past history is as important as making sure it's in a safe location. Request customer referrals whenever possible and gather as much information as you can about the provider before you make your decision.

Make Sure There Is Room For Growth & Expansion

Although it's important to put a heavy focus on what your company needs now in terms of equipment and performance, it's also crucial to look to your company's potential future needs and ensure there

is enough room for expansion years down the road. Instead of backing yourself into a corner, make sure your colocation provider's facility is flexible enough to support more or less equipment depending on whether you wish to expand or consolidate at a later date.

Check The SLA

"Be sure to compare the SLA to the services you are planning to use," says Brett Femrite, sales manager at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Some SLAs have varying levels of coverage based on the services that you choose. Be sure to note whether there is a

redundant service offering that you must opt in to use in order to be fully covered by the SLA. Examples include A/B power or redundant network connections."

Stahl says to push for the contract to include an annual services review and ability to right-size or contract services so you don't pay for capabilities you don't need. Some of the best vendors do this upfront, he says.

Conduct a quarterly operations-style meeting with the vendor to discuss what you did in the space during that time, what worked and didn't, and what you have planned. Ask the vendor to do likewise, which may result in learning the vendor's scheduled outages. **P**

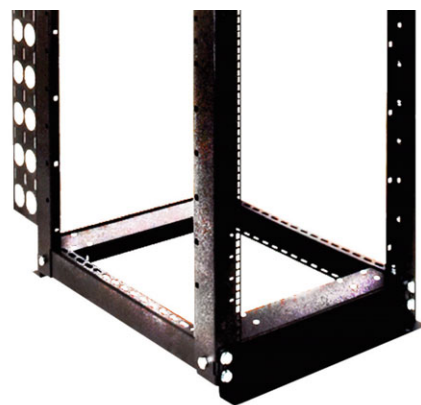
CHECKLIST

Mark McClelland, VP of IT services at Mainstream Technologies (501/801-6700; www.mainstream-tech.com), offers this list of items to check when selecting a colocation or failover site location:

- Available infrastructure at the secondary site and connectivity between the primary and secondary sites
- Location of failover data center as a geographical risk
- Site outage history
- Latent single points of failure (common electrical grid, common ISP backbones) between primary and secondary site
- Availability of extra capacity at secondary site
- Physical security
- Certifications or audits relative to regulatory requirements and risk mitigation
- Cost
- References

BUYING TIPS:

Data Center Racks & Cabinets



RACKS AND CABINETS hold and protect every piece of equipment that runs your data center, so don't rush the decision about which cabinet to purchase. Instead, focus on the most important features and ensure the cabinet will fulfill your needs for years to come.

Know What's On The Market

Start by researching what's on the market. There are full-sized, midsized, and smaller cabinets as well as racks with heights of 30 to 84 inches and widths of 24 to 36 inches.

Rodger Baldwin, executive account manager at Rack Solutions (888/903-7225; www.racksolutions.com), says to consider the height, depth, and width of the cabinet before making a purchase. He says more companies are asking for wider, deeper cabinets. "We have clients asking for 30 inches wide and 48 inches deep," he says, so they can accommodate larger servers, extra cable management space, and better airflow for the equipment mounted in the cabinet.

Eli E. Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com), says to look for potential add-on items, such as overhead storage compartments, power and cable management solutions, and back and side panels. Different sized racks and cabinets paired with additional solutions can

help you design a product that's perfect for your data center.

Pinpoint Special Needs

"Establish what you need the cabinet to do," says Susan Wynne, senior sourcing specialist for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "If the equipment is noisy, you may want a sound reduction cabinet. If the environment is dirty, you may need a filtered cabinet. Even the area of the country is important, and you may need an air-conditioned or NEBS cabinet."

Other considerations include whether you have a sprinkler-based fire suppression system that requires NEMA 12 certified cabinets that keep out moisture, Wynne says. You should also consider built-in security measures, such as locked cages or other alternatives, if there is a lot of traffic in your data center.

Get The Right Fit

In most cases, you've decided which pieces of equipment to buy for your data center before you start shopping for the racks and cabinets to store them. It's a great opportunity to measure each piece and create a mock configuration for how it will fit into the rack or cabinet. "This ensures the cabinet is tall enough, wide enough, and deep enough to handle the longest piece of equipment to be populated into the cabinet," Wynne says.

But be careful you don't populate the racks or cabinets with more equipment than you can reasonably concentrate in one area, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com).

A higher density of equipment creates more heat and possible hot spots. "Make sure your cooling equipment can adequately cool the equipment before you put it all in one spot."

The amount of space the rack or cabinet takes up is equally important. "Make sure the outside dimensions of the cabinet will fit in the designated location," Wynne says. Leave adequate space for future expansion. If you don't, you could get stuck with a cramped and inefficient data center with no room for evolution.

Check For Airflow

If you are utilizing raised floors and CRAC units, having vents or grills to allow airflow through the structure is essential, Koty says. "Look for server cabinets that provide good ventilation. Make sure that the cabinets draw cold air from the front and discharge in the back to enable a hot/cold-aisle configuration."

Baldwin agrees, adding, "whether or not you are using hot/cold aisles, the cabinets should always meet or exceed the [airflow] requirements of the equipment being installed."

Research The Vendor

Hertz says you should be able to grill the supplier on what you are actually going to be getting, and the vendor should know the product from nuts to bolts. **P**

CHECKLIST

Cable management. Is cable management built-in, or does the rack or cabinet leave adequate space to neatly route cables?

Mounting. Does the rack/cabinet provide PDU mounting options such as brackets?

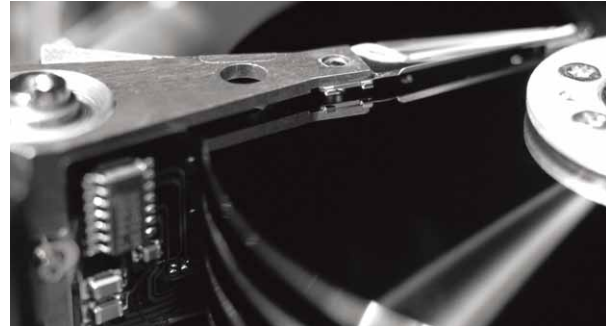
Special requirements. Does the equipment you're mounting require tapped or M6 holes?

Check for fit. Will you need to disassemble the rack/cabinet to get it in the room?

Security. Is the cabinet lockable to prevent potential security issues?

BUYING TIPS:

Enterprise Backup Solutions



IN A WORLD where your organization could focus 100% of its resources on creating products and offering services, backing up data wouldn't be necessary. But the fact is, storage fails, and the only way for your organization to survive the inevitable is to regularly allocate resources toward making redundant copies of your data.

Knowing how to budget for, buy, and think about physical onsite backup products such as tape, disk, virtual tape, and more is essential. Here are some items to consider.

Research & Deliberation

First and foremost, says Greg Schulz, senior advisor at Server and StorageIO, those in the market for an enterprise storage backup product need to make a careful accounting of their requirements before spending a dime. "Which means understanding what you would like to have vs. what would be nice to have."

Schulz says the factors that should weigh heavily in your decision include your performance, availability, and capacity needs as well as the product's ability to interoperate with and incorporate existing hardware, software, networking technology, and infrastructure.

In many cases, supplementary tools, technology, hardware, or software will be necessary

to make the backup product adequately address your particular needs. Schulz adds that in almost all cases, however, people skills, policies, and procedures will need to be updated or added.

Creating a thoughtful backup plan is one of the better ways to save money: Give the most critical data access to more redundancy, and don't back up disposable data. You can also save on the cost of media and disk space using compression, deduplication, and thin provisioning techniques.

Avoid Potential Pitfalls

If your organization is leaning toward updating its backup technology significantly, for instance by moving from tape to disk, then make sure to reevaluate retention cycles, as well as when and how data is protected, Schulz says.

"Don't forget to ask yourself this question: What are you looking to solve, fix, or address via the technology you are going to acquire? Are you actually taking care of a problem or need or simply moving and masking it, kicking the can down the road and delaying what needs to be done until later?"

One of the most common mistakes, Schulz says, is "focusing too much on obtaining something new and then using it in old ways."

Be careful to not confuse wants with needs or requirements. Dealing with unclear requirements can also hinder the hunt for an ideal solution. Try not to focus too much on the given technology or product, but instead think about how it will integrate into your environment.

Schulz says the No. 1 mistake he sees firms commit is to focus on getting the lowest-cost solution instead of "the best value along with total cost analysis." Schulz adds that it's vital to get accurate numbers when calculating TCO, as "garbage into a TCO model can result in garbage out of a TCO model."

Get Your Priorities Straight

Schulz says to avoid getting caught up trying to figure out

how a given technology can benefit your organization.

"The most important thing is to determine how the technology will work for you. How will the solution or technology fit into your overall strategy—coexist with your environment, applications, and existing technologies?"

Schulz says other things to keep in mind include the upfront capital and operating costs, along with recurring costs for licenses, maintenance, upgrades, training, education, or optional enhancements over a given period of time (usually several years). Checking the "reliability, scalability, and resiliency of the solution, along with stability or track record of the vendor and their support" is also important. **P**

CHECKLIST

Understand the requirements. Fully investigate your chosen backup technology to get a clear picture of hardware, software, training, and personnel requirements.

Know if you'll need support. If you don't have IT personnel tasked with building and maintaining backups, look for offerings with comprehensive 24/7 support.

Seek help with integration. Consider using consulting and integration support to help you make the most of your backup strategy.

Check for legal requirements. Before pulling the trigger, be aware of any industry- and data-specific legal requirements and regulations you may need to heed.

BUYING TIPS:

Fire Protection

FIRE PROTECTION SYSTEMS aren't just something you can put in during data center construction and forget about. As you invest in new technologies such as consolidation or hot aisle/cold aisle containment, your fire protection system can quickly become outdated and inadequate. Here's what you need to know when selecting a fire protection system for your data center.

Understand The Basics

Chris Jelenewicz, P.E., engineering program manager at the Society of Fire Protection Engineers, says there are several factors to consider when installing fire protection systems, including the building's structure, occupants, first responders, and equipment.

Jelenewicz says both active fire systems (sprinkler, gaseous, alarm and communications, smoke management, etc.) and passive fire systems (fire doors, walls, etc.) are necessary to protect people, property, and structures. Both system types "should be designed so that they work together as one complete fire protection system."

Melanie Davy, analyst at Info-Tech Research Group, says at a minimum, a data center must have a sprinkler system, fire detection and alarm components, portable fire extinguishers, and emergency power-off abilities (according

to NFPA 75). Other forms of protection, such as clean-agent suppression systems, are classified as add-ons.

Fire protection is generally divided into water and non-water options. The obvious downside to using a sprinkler system is that electronic devices and water can be a bad combination, especially in situations that are started by electrical fires. Thus, most data centers opt to go with a clean-agent or aerosol-agent suppression system, which is designed to leave no residue and is safe for both electronics and people, unlike some chemical-based fire protection.

Get The Right System

When selecting a protection system, install the best system for the given application. This requires contemplating many factors, Jelenewicz says, including the type and number of occupants in the building, the ease of system maintenance, and if an adequate water supply is available. Additionally, consult a fire protection engineer to help select the right system and prepare the design, installation, and maintenance requirements, he says.

Be sure to note portions of the protection system that are mandatory vs. best practice, Davy says. For example, although smoke detectors are mandatory,

it is a best practice to install both heat and smoke detectors.

Check For Alert Choices

You'll need to know at what stage during a fire the detection system should trigger the suppressant to release. Effective detection is key, as the suppression system is only as good as the detection system initiating the release.

Invest in a smoke and fire detection system that can alert employees and IT staff to problems. Some models are capable of detecting the various stages of a fire, such as visible smoke, flaming fire, and intense heat, to allow you to set off alarms or activate various stages of fire protection.

Check For Applicable NFPA Regulations

The NFPA, or National Fire Protection Association,

regularly releases codes and standards related to fire protection across multiple industries and building environments. For data centers, it isn't necessary to memorize every single regulation, but there are some helpful ones to be aware of.

NFPA 75: Standard for the Fire Protection of Information Technology Equipment, 2013 Edition, according to the NFPA, addresses requirements for rooms or areas with computer installations needing fire protection, including suppression, detection, and building construction.

NFPA 2001: Standard on Clean Agent Fire Extinguishing Systems, 2012 Edition, offers information on purchasing, designing, and testing gaseous fire suppression systems, according to the NFPA. [\[E\]](#)



CHECKLIST

Make sure the system fits the room. Find a smoke/fire detection system that meets your needs in terms of stages of fire protection and number of physical detection locations.

Special considerations for clean-agent systems. Research the various clean-agent suppression options and make sure your sprinkler system can work with the clean-agent suppression system.

Cut the power. Invest in an emergency power off system to shut off electricity when a fire is detected.

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www.AITP-LI.org

AITP Southwest Missouri

Nov. 19
High Street Baptist Church
900 N. Eastgate Ave.
Springfield, Mo.
aitpspringfield.org/main.html

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Dallas, Texas
www.devopslive.org

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www.tampabayafcom.com

AITP Northeastern Wisconsin

Nov. 20
Holiday Inn Appleton
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new.aitp.org/eventsmeeting-info

AITP San Antonio Chapter

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San Antonio, Texas
www.aitp.org/group/174

AITP Cornhusker

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Eatery Restaurant
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Lincoln, Neb.
www.aitpcornhusker.org

AITP Twin City

Nov. 21, 7 p.m.
Ozark House Restaurant
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Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

ISSA Inland Empire

Nov. 22, 6 to 9 p.m.
Upland, Calif.
ie.issa.org

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Nov. 27
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www.aitpcalsouthland.org

ISSA Baltimore

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www.bigdatatechcon.com

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March 30-April 4
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www.interop.com/lasvegas

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www.sptechcon.com

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The Mirage
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www.datacenterworld.com/spring

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PROCESSOR[®]

Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

**To list your company and products,
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